

HP management software for Linux on ProLiant servers

HOWTO, 6th Edition



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Abstract

This HOWTO provides instructions for installing, upgrading, and removing management software, includes prerequisites for using this software with and without errata kernels, and contains usage information for each of the following management software products:

- HP Server Management drivers and agents
- HP Lights-Out drivers and agents
- HP storage agents
- HP NIC agents

Reference links to installation instructions for HP Systems Insight Manager and Rapid Deployment Pack are also provided.

Text conventions

This HOWTO uses the following conventions to distinguish elements of text:

Menu options, Command names, Dialog box names, Screen names

These elements appear in initial capital letters and may appear in boldface for emphasis.

User input (commands to be typed)

User input appears in a different typeface and is highlighted in gray.

Scripts and files

The content of the scripts and files appears in a different typeface and is highlighted in gray with a border around it.

Boldface text should be located on one line instead of on multiple lines as shown in the samples; formatting in this document prohibits correct usage.

HP Server Management Drivers and Agents

The HP Server Management Drivers and Agents (hpasm) replace the HP ProLiant Advanced Server Management Driver (Health Driver). These drivers and agents collect and monitor important operational data on ProLiant servers. Contained within the hpasm package are the following:

- Advanced Server Management Driver (Health Driver)
- Integrated Management Log (IML) Viewer Application
- Foundation Agents
- Health Agent (formerly in the Server Agents package)
- Standard Equipment Agent (formerly in the Server Agents package)
- Server Peer Agent (formerly in the Server Agents package)

ProLiant servers are equipped with hardware sensors and firmware to monitor certain abnormal conditions, such as abnormal temperature readings, fan failures, error correction coding (ECC) memory errors, etc. The Health Driver monitors these conditions and reports them to the administrator by printing messages on the console (preserved in /var/log/messages) It also logs the condition to the ProLiant Integrated Management Log (IML). The IML is dedicated Non-Volatile RAM (NVRAM) that can be viewed and maintained by the cpqimlview or hplog application.

The ProLiant Management Agents are included to provide proactive notification of server events through the Systems Insight Manager console. Alternatively, the ProLiant Management Agents allow the status of the server to be monitored or checked using a standard Web browser. Some ProLiant servers contain an Integrated Lights-Out (iLO) controller that, with optional software, allows secure remote management of the server including IML management and graphical remote console. For servers without the embedded iLO controller, similar functionality is available through an optional Remote Insight Lights-Out Edition (RiLOE) or Remote Insight Lights-Out Edition II (RiLOE II) adapter. The Health Driver works in conjunction with the ProLiant Management Agents to provide this support.

Customers without automatic monitoring tools can check servers that have the ProLiant Management Agents installed using a standard Web browser. The Web Agent responds to port 2381 (if the installed browser supports SSL encryption). For example, point the browser to `https://192.1.1.20:2381` or `https://localhost:2381` (the "https://" portion of the address is required).

There are also `/proc` file entries that allow making quick checks (see Table 1).

Table 1. `/proc` descriptions

File entry	Description
<code>/proc/cpqtemp</code>	Shows the current temperature and the threshold levels of all temperature sensors.
<code>/proc/cpqfan</code>	Shows the status of all fans.
<code>/proc/cqpwr</code>	Shows the status of all power supplies.

Additional information about ProLiant Management Agents is available at the following locations:

- www.hp.com/servers/manage
- <http://h18000.www1.hp.com/products/servers/management/agents.html>

Another source of information is the man pages included with the `hpasm` package:

- `hpasm`
- `cpqimlview`
- `hpuid`
- `hplog`

These man pages include detailed information on error messages and possible action that the administrator may take.

Setup procedures

The Server Management Drivers and Agents are available as an RPM file. As with every RPM file, you may install, query, refresh, and uninstall the package. For the remainder of this section, we discuss how to install and uninstall the package. We also show you how the package should react during regular operation.

Prerequisites

For the Web Agent to work properly, you must install the required library or package for the Linux distribution (see Table 2).

Table 2. Web Agent requirements

Linux distribution	Required library or package
Red Hat Linux distributions	compat-libstdc++ library
SUSE LINUX Enterprise Server 7	compat-2001.5.29 and gppshare
UnitedLinux 1.0	compat-2002.8.15 package

For full functionality, the Web Agent also requires the following:

- SNMP stack
- Version 1.4.1 Java Virtual Machine or greater

Note

The recommended SNMP stack is the UC-Davis SNMP stack provided on the HP Linux website (www.hp.com/linux). The Stack provided by HP includes the extensions needed by the HP agents.

Installing the drivers and agents

1. You must uninstall previous versions of the hpasm package before installing the new RPM file. See the "Uninstalling the drivers and agents" section for information on removing the drivers and agents.

If concurrent access on the RPM database is attempted, the following messages may result:

```
rpmQuery: rpmdbOpen() failed
cannot get shared lock on database
rpmQuery: rpmdbOpen() failed
```

2. Some of the ProLiant Management Agents for Linux use RPM to query loaded software packages. Before attempting RPM maintenance, HP recommends terminating the agents with `/etc/init.d/hpasm stop` and ensuring that only one root shell exists.
3. After obtaining the RPM file, login as the "root" user and type the following to install the drivers and agents:

```
rpm -ivh hpasm-<version>.<distribution>.i386.rpm
```

Note

The version number for the RPM file depends on the supported systems and functionality. The distribution refers to the Linux distribution supported by the RPM. The RPM file has a binary compiled for the supported distribution with the default kernel.

4. To install or create the RPM for a non-default kernel, install the kernel sources for the compiled kernel. In addition, the development packages required for rebuilding a kernel may need to be present.

5. During the installation process, provide basic Simple Network Protocol (SNMP) information, when prompted. The recommended SNMP stack is the UC-Davis SNMP stack provided on the HP Linux website (www.hp.com/linux). This stack is required to have full management support. The drivers and agents will be inserted immediately. On systems with variable speed fans, you may notice that the fans will start spinning more slowly if the temperature is reasonably low.
6. To check if the driver is loaded properly, type the following command (which is only available when logged in as "system administrator", "super user", or "root"):

```
lsmod
```

You should see an entry indication that two drivers have been inserted: cpqasm and cpqevt. The cpqasm and the cpqevt drivers should have a use count of 20 and 2, respectively, with the cpqevt driver showing a dependency on the cpqasm driver.

7. To check if the agents are loaded properly, type the following:

```
ps -ef | grep cma
```

You should see an entry indication that the following agents are running: cmafdtnpeerd, cmahostd, cmathreshd, cmawebd, cmasvrpeerd, cmastdeqd, and cmahealthd.

Upgrading the drivers and agents

RPM provides the option to upgrade a package.

1. Before upgrading, uninstall any RPM packages that are dependent on the hpasm package, such as the Lights-Out Drivers and Agents, the Storage Agents, and the NIC Agents, since these packages are dependent upon a specific hpasm package version.

Important

Attempting to install these packages on an unsupported hpasm package version might result in an unstable system.

2. To uninstall any packages present on the server, type the following, in exact order:

```
rpm -e cmanic
rpm -e cmastor
rpm -e cmasvr
rpm -e cmafdtn
rpm -e cpqriis
rpm -e cpqci
rpm -e cpqrid
rpm -e hprsm
```

3. To upgrade the hpasm package, type the following command:

```
rpm -Uvh hpasm-<version>.<distribution>.i386.rpm
```

If the upgrade option is used, the hpasm package will stop after installation to preserve system stability to allow the user to upgrade any components dependent upon the hpasm package (for example, hprsm, cmastor, and cmanic).

You cannot upgrade the cpqhealth package. You must remove the previous version (`rpm -e cpqhealth`) before installing the newer version of hpasm. You can use the upgrade command shown above to install the hpasm package.

After installing the package, the agents do not start immediately. Instead, the following message should appear on the terminal:

NOTE: In order to activate the software contained in this package, you must type `hpasm activate` as the "root" user.

After typing `% hpasm activate`, the software guides you through various questions which relate to the way SNMP should be configured with the ProLiant Management Agents. The last question pertains to which agents, if any, should be started during the standard boot process. The Health Driver will always be loaded; however, you may control the agents' behavior.

You may also manipulate the `/opt/compaq/cma.conf` file which contains one or more exclude directives. Any string after the exclude keyword is interpreted as an agent name that should not be started. Examples include:

```
exclude cmahealthd cmawebd
exclude cmastdeqd
```

These two lines exclude three agents from the startup: the Health Agent (`cmahealthd`), the Web Agent (`cmawebd`), and the Standard Equipment Agent (`cmastdeqd`).

4. To start the `hpasm` package manually, type the following command:

```
/etc/init.d/hpasm start
```

Running the drivers and agents

For additional information and help, a man page is available by typing:

```
man hpasm
```

Uninstalling the drivers and agents

There are two options for preventing the drivers and agents from running: (1) to uninstall or (2) to unload.

- To uninstall the drivers and agents using the RPM standard, type:

```
rpm -e hpasm
```

This command removes the `hpasm` package from your system. If the `hpasm` package was running, it will be shut down first. If you reboot the system, the `hpasm` package will not be inserted at bootup time.

- To unload the drivers and agents, type (as "system administrator"):

```
/etc/init.d/hpasm stop
```

If an error condition occurs, the driver will log an entry to the system log, the health log, and the (text) console. Using the above command will not prevent the driver from being inserted during the next boot of the operating system.

Custom builds and packaging

The `hpasm` package can be installed on "custom" or patched Linux kernels. There is a source wrapper file that abstracts the Linux functionality from the remainder of the driver code. If there is a Linux kernel symbol mismatch, the boot time script, `/etc/init.d/hpasm`, will check to see if the Linux kernel source files are present. If so, the script will automatically rebuild and load the driver. If the Linux kernel source files are not present, a warning message will be displayed.

To successfully install the `hpasm` RPM package, the following criteria must be met:

- All kernel sources for the currently running kernel must be installed on the server.

- The link `/lib/modules/`uname -r`/build` must exist and be linked to the directory containing the (possibly patched) kernel sources.
- The standard build tools, such as `gcc`, `ld`, `make`, and `touch` must be loaded on the server.
- The file `/lib/modules/`uname -r`/build/include/linux/version.h` must exist and match the version of the booting kernel on the development server and the version of the booting kernel on any other server where this custom RPM will be deployed.

Many servers do not have all of this software available. Therefore, HP provides a self replication mechanism that creates a custom RPM that can be deployed without these dependencies.

The `hpsasm` RPM places deliverables in the `/opt/compaq` directory. Those deliverables are subdivided into several directories. The rebuild script is provided in the `/opt/compaq/hpsasm/etc` location. This script is also soft linked under the `/sbin` directory under the name `hpsasm_rebuild`.

To create a custom `hpsasm` package (after the requirements have been met), execute the following:

```
hpsasm rebuild
or
/opt/compaq/hpsasm/etc/rebuild
```

The completed packages will be copied to the `/usr/src/redhat/RPMS/i386` or `/usr/src/packages/RPMS/i386` directory. The RPMs are versioned as "CUSTOM" to distinguish these RPMs from the standard drivers.

The Health Driver exposes the following device nodes that are used to control its operation. These character device nodes are dynamically allocated a major number, and the minor numbers are assigned as follows:

0 = <code>/dev/cpqhealth/casm</code>	<code>casm</code> daemon interface
1 = <code>/dev/cpqhealth/casr</code>	Automatic Server Recovery
2 = <code>/dev/cpqhealth/cecc</code>	ECC Memory
3 = <code>/dev/cpqhealth/ccsm</code>	Legacy Interface
4 = <code>/dev/cpqhealth/cmca</code>	Machine Check Architecture
5 = <code>/dev/cpqhealth/cside</code>	Legacy Interface
6 = <code>/dev/cpqhealth/cevt</code>	Event Log
7 = <code>/dev/cpqhealth/cpci</code>	Legacy interface
8 = <code>/dev/cpqhealth/cdt</code>	Data Table
9 = <code>/dev/cpqhealth/cpqw</code>	Redirector interface
10 = <code>/dev/cpqhealth/crom</code>	EISA CROM
11 = <code>/dev/cpqhealth/cram</code>	Legacy interface
0 = <code>/dev/cpqhealth/cmhp</code>	Memory Hot Plug interface

To insert the driver at bootup time, a link to `/etc/init.d/hpsasm` is created in run levels 2 through 5. If there is a problem with the Health Driver, you can bring the system up in maintenance mode (init 1, also known as single user mode) or use interactive boot to correct the issue.

Rebuilding the `hpsasm` package

To recreate `hpsasm` package version 6.40.0 or later for fast redeployment, type:

```
% hpsasm_rebuild
```

This command creates a custom RPM which does not rebuild all drivers. Instead, these packages land only on servers containing a kernel version identical to the one used to give the `hpsasm_rebuild` command.

To specify configuration settings before issuing the rebuild command, perform either of these actions:

- Type the following after RPM installation:

```
% hpasm activate
```

- Type the following after the activation step:

```
% service hpasm configure
```

The script logic creates a file called `hpasmrc` that stores the latest configuration settings. Here is an example of such a file:

```
# install mode
export CMASILENT="YES"
# kernel version
export CMAKERNELVERSION="2.4.18-27.8.0smp"
#local rw community string
export CMALOCALHOSTRWCOMMSTR=""
#local ro community string
export CMALOCALHOSTROCOMMSTR=""
#rw authorized management stations (multiples allowed)
export CMAMGMTSTATIONRWIPORDNS=""
#rw authorized mangamane station community string (multiplies allowed)
export CMAMGMTSTATIONRWCOMMSTR=""
#ro authorized management stations (multiples allowed)
export CMAMGMTSTATIONROIPORDNS=""
#ro authorized mangamane station community string (multiplies allowed)
export CMAMGMTSTATIONROCOMMSTR=""
#default trap community string
export CMADEFTRAPCOMMSTR=""
#trap recipients (multiples allowed)
export CMATRAPDESTINATIONIPORDNS=""
#trap recipient community strings (multiples allowed)
export CMATRAPDESTINATIONCOMMSTR=""
#system contact
export CMASYSCONTACT=""
#system location
export CMASYSLOCATION=""
#agent exclusion on startup
export CMAAGENTEXCLUDESTR="cmawebd cmafdtnpeerd cmahostd cmathreshd cmasvrpeerd
cmahealthd cmastdeqd cpqriisd cmasm2d cmarackd"
#HTTP server passwords
export HPHTTPSERVERADMINPASSWD=""
export HPHTTPSERVEROPERATORPASSWD=""
export HPHTTPSERVERUSERPASSWD=""
```

When a rebuild command is issued, this file will be picked up and used on the deployment of the custom RPM.

The `CMAKERNELVERSION` parameter provides additional protection. If a custom RPM package is deployed with a `CMAKERNELVERSION` that does not match the current kernel, the package would refuse a silent install and instead revert back to the usual interactive mode (creating the need to type `hpasm activate`).

To customize the rebuild step even further, you can perform a minimal rebuild. Since `hpasm` contains many software components and web file templates, there are cases where you may need a minimal RPM, containing only a choice few deliverables. For example, consider a situation where you do not desire agents and web templates. In this case, use Red Hat Linux 8.0 as our base OS distribution. We assume that we want to deploy `hpasm` on a Linux errata kernel (2.4.18-27.8.0.smp) and not the stock kernel that came with the distribution (2.4.18-14smp).

The first step is to manipulate `/etc/hpasmrc` to look like the sample file mentioned previously. In this file, we do not use any settings except `CMASILENT=YES` (to make the configuration automatic); `CMAKERNELVERSION` is set to the kernel we want to support, and `CMAAGENTEXCLUDESTR` has a list containing all the agents. This will cause the agent exclusion later.

Next, we will have to manipulate the rebuild process.

We have a rebuild script which resides in `/opt/compaq/hpasm/etc`. The rebuild script uses two files, `hpasm.txt` and `hpasm-manifest.txt`, in the same directory. The `hpasm-manifest.txt` file contains a list of files and directories used during the rebuild. Since we do not want the agents running, we can safely

omit the agent executables. Keep in mind that this is only safe because we excluded all agents from running, which makes the run-level scripts ignore the file locations we are about to delete.

Furthermore, that package contains the Health Driver for a multitude of stock kernel versions. Since we are building on an errata kernel, these precompiled versions become an unnecessary burden. Therefore, we can delete the precompiled versions from our custom build as well.

Even though it would be permissible to simply comment out the files in question from hpasm-manifest.txt, we will be a little more conservative by omitting files within directories, while preserving the directories themselves. Then, before issuing the rebuild command, we will delete the files in question from our file system so they will not be picked up. This strategy is also valid for the case where the manifest describes a whole directory structure, but certain files in it have become undesirable.

With that said, we first start to delete the following directory content:

```
# Delete all the foundation agents
rm -f /opt/compaq/foundation/bin/*
# Delete all the server agents
rm -f /opt/compaq/server/bin/*
# Delete all web agent templates
rm -rf /opt/compaq/webagent/*
# Delete the configuration tool for web agent
rm -f /opt/compaq/foundation/etc/hpwebsetup
# Delete memory hot plug driver for other, unused kernels
find /opt/compaq/ -name 'cmhp.o' | grep -v 2.4.18-27.8.0 | xargs rm -f
# Ditto for health driver and event driver
find /opt/compaq/ -name 'cpqasm.o' | grep -v 2.4.18-27.8.0 | xargs rm -f
find /opt/compaq/ -name 'cpqevt.o' | grep -v 2.4.18-27.8.0 | xargs rm -f
```

Now, we need to clean up hpasm-manifest.txt file in order to remove the occurrence of the deleted files. As discussed above, we will preserve the directories in which these files reside.

```
%files
%defattr (755,root,root)
/opt/Compaq/hpasm/etc/hpasm
/opt/compaq/hpasm/etc/common.functions
/opt/compaq/hpasm/etc/cpqasm.functions
/opt/compaq/hpasm/etc/foundation.functions
/opt/compaq/hpasm/etc/server.functions
/opt/compaq/hpasm/etc/rebuild
/opt/compaq/hpasm/addon/cmad
/opt/compaq/hpasm/addon/condcopy
/opt/compaq/hpasm/addon/condrem
/opt/compaq/hpasm/addon/sancheck
/opt/compaq/hpasm/addon/libcpqci.so
/opt/compaq/hpasm/addon/libcpqci.so.1
/opt/compaq/hpasm/addon/libcpqci.so.1.0
/opt/compaq/hpasm/addon/libcmaX.so
/etc/init.d/hpasm
/etc/casmd.conf
/etc/cevtcl.conf
/etc/cevtclm.conf
%defattr (644,root,root)
/opt/compaq/hpasm/distro.txt
/opt/compaq/hpasm/hpasm.license
/opt/compaq/hpasm/etc/hpasm.txt
/opt/compaq/hpasm/etc/hpasm-manifest.txt
/opt/compaq/hpasm/addon/condcopy.txt
/opt/compaq/hpasm/addon/sancheck.txt
/opt/compaq/hpasm/addon/cpqbssa.txt
/opt/compaq/hpasm/addon/cmasvobjects.conf
%defattr (755,root,root)
/opt/compaq/cpqhealth
/usr/share/man/man4/cpqhealth.4.gz
/usr/share/man/man4/hpasm.4.gz
/usr/share/man/man8/cpqimlview.8.gz
/usr/share/man/man8/hpuid.8.gz
/usr/share/man/man8/hplog.8.gz
/sbin/bootcfg
/sbin/cpqimlview
/sbin/cpqimlview.tcl
/sbin/imlbe
/sbin/hpimlview
/sbin/hpuid
/sbin/hplog
/usr/share/pixmaps/hplogo.xbm
/usr/share/pixmaps/m_blue.gif
/usr/share/pixmaps/m_fail.gif
```

```

/usr/share/pixmaps/m green.gif
/usr/share/pixmaps/m red.gif
/usr/share/pixmaps/m yellow.gif
%defattr(-,root,root)
/opt/compaq/foundation
/opt/compaq/foundation/etc/cmafdtn
/opt/compaq/foundation/etc/cmafdtnpeerd
/opt/compaq/foundation/etc/cmahostd
/opt/compaq/foundation/etc/cmathresh
/opt/compaq/foundation/etc/cmawebd
#/opt/compaq/foundation/etc/hpwebse
/opt/compaq/foundation/etc/cmafdtnobjects.conf
/opt/compaq/foundation/etc/snmpd.conf.cma
/opt/compaq/webagent
%defattr(-,root,root)
/opt/compaq/server/bin
/opt/compaq/server/etc/cmasvr
/opt/compaq/server/etc/cmasvrpeerd
/opt/compaq/server/etc/cmahealthd
/opt/compaq/server/etc/cmastdeqd

```

Notice that some of the deleted files reside in subdirectories that were specified in the original manifest file (highlighted in green above). Other files were listed and are now omitted, but we ensured that their directories still exist (highlighted in yellow above).

Now, it is time to rebuild.

```

% hpsm rebuild
....
Custo          ilable: /usr/src/redhat/RPMS/i386/hpsm-6.40.0-custom.i386.rpm

```

The custom RPM is much smaller in size.

```

[root@ilo8j22jqx1700r root]# ls -la /usr/src/redhat/RPMS/i386/hpsm-6.40.0-
custom.i386.rpm
-rw-r--r--  1 root    root      622457 Jul 22 14:16 /usr/src/redhat/RPMS/i386/hpsm-
6.40.0-custom.i386.rpm

```

Deploying is now automatic and will start only the Health Driver.

```

[root@ilo8j22jqx1700r i386]# rpm -e hpsm
[root@ilo8j22jqx1700r i386]# rpm -ivh hpsm-6.40.0-custom.i386.rpm
Preparing...                               ##### [100%]
 1:hpsm                                     ##### [100%]
Please read the Licence Agreement for this software at

    /opt/compaq/hpsm/hpsm.license

By Not removing this package, you are accepting the terms
of the "License for HP Value Added Software".

=====
NOTE: New snmpd.conf entries were added to the top of /etc/snmp/snmpd.conf
=====
NOTE: New cma.conf entries were added to the top of /opt/compaq/cma.conf
=====
HP HTTP server's passwords were all preserved to their previous setting.

F
  CMAAGENTEXCLUDESTR
  HPHTTPSERVEROVERWRI

S
nt Drivers and Agents, please wait ...
casmd: hp ProLiant Advanced Server Management Monitoring . . .
cevt: hp ProLiant Event Logging daemon started . . .
The hpsm RPM has installed successfully.
[root@ilo8j22jqx1700r i386]# lsmod
Module          Size      Used      inted: P
cpqasm          335904    2
cpqevt          9376     2

```

Starting and stopping components

After the initial install, both the ProLiant Management Agents and the Health Driver are loaded. Upon a reboot, a run-level script in `/etc/init.d/hpasm` reloads the driver and agents, even if a different kernel was used for the new run.

To modify which components are run, see Table 3 for a list of available options.

Table 3. Available options for modifying components

Option	Description
hpasm activate	<ul style="list-style-type: none">This command should be issued only once after the initial install. <div>Exception When the hpasm package is installed through the ProLiant Support Pack or another unattended install mechanism, it is unnecessary to execute this command.</div> <ul style="list-style-type: none">Drivers contained in this package are rebuilt for the custom/errata kernel, if necessary.A series of questions prompts the user to configure SNMP and the Web Agent (similar to the <code>hpasm configure</code> command).This command ensures start up of the contained agents and drivers during boot.
hpasm start	Starts every software component in hpasm (Health Driver and Agents).
hpasm stop	Stops all software components in hpasm in reverse order from how they were started.
hpasm start cpqasm	Starts the Health Driver (cpqasm) only.
hpasm stop cpqasm	Stops the Health Driver (cpqasm) and every agent dependent upon it.
hpasm start driver	Starts all drivers contained in the HP Server Management Drivers and Agents (cpqasm) and HP Lights-Out Drivers and Agents (cpqci, cpqrid) packages.
hpasm stop driver	Stops all drivers contained in the HP Server Management Drivers and Agents (cpqasm) and HP Lights-Out Drivers and Agents (cpqci, cpqrid) packages as well as all agents dependent on them.
hpasm start agent	Starts every ProLiant Management Agent.
hpasm restart [args]	This command is shorthand for the following: <ul style="list-style-type: none">hpasm stop [args]hpasm start [args]
hpasm reconfigure	<ul style="list-style-type: none">Stops the Server Management Drivers and Agents.Reconfigures snmpd configuration and uses existing state as a basis.Stops and starts SNMP.Starts the Server Management Drivers and Agents.
hpasm configure	<ul style="list-style-type: none">Stops the Server Management Drivers and AgentsResets snmpd configuration and configures snmpd.Stops and starts SNMP.Starts the Server Management Drivers and Agents.
hpasm unconfigure	<ul style="list-style-type: none">Stops the Server Management Drivers and Agents.Unconfigures snmpd configuration back to its initial state.Stops and starts SNMP.

Health Driver features

The Health Driver augments the hardware features built into ProLiant servers. Basic features, such as temperature, fan, power supply, and memory monitoring are standard on almost all ProLiant servers. On some ProLiant servers, the Health Driver supports features such as variable speed fans, Intel Machine Check Architecture monitoring, server lights that give a visual indication of a possible error condition, and Advanced Memory Protection (AMP). The AMP feature allows the capability of reserving memory for fail over if a Single Bit Correctable Error (SBCE) threshold is exceeded.

On some ProLiant servers, the entire memory subsystem can be mirrored to survive an uncorrectable memory error. Without AMP, uncorrectable memory errors are always fatal and cause a kernel panic. AMP allows a server to continue execution until the faulty memory can be replaced. Mirrored AMP solutions usually allow removing the memory board with the faulty memory dual in-line memory module (DIMM) and replacing the faulty DIMM while the server continues execution. When the repaired AMP memory board is inserted back into the server, the AMP mirror will automatically be restored. This allows mission critical 7 X 24 applications to continue execution without interruption or downtime.

The following sections explain the features provided by the Health Driver for the overall health of the ProLiant server.

System temperature monitoring

A ProLiant server may contain several temperature sensors. On ProLiant servers with intelligent temperature sensors, check the current and threshold temperatures by displaying the `/proc/cpqttemp` file system entry.

If the normal operating range is exceeded for any of these sensors, the Health Driver does the following:

- Displays a message to the console stating the problem.
- Makes an entry in the system health log and the operating system log.

Additionally, on some servers, the fans will gradually increase to full speed in an attempt to cool the server as the external environment temperature increases. If the server exceeds the normal operating range and does not cool down within 60 seconds, the operating system will, in most cases, be shutdown to close the file systems.

Note

On servers that do not have variable speed fans, the server will be shutdown unless the ROM-Based Setup Utility (RBSU) Thermal Shutdown feature is disabled (this feature is enabled by default). Use RBSU to control the shutdown option.

System fan monitoring

The status of the fans can be checked by displaying the `/proc/cpqfan` file system entry. If a cooling fan fails and there is no secondary redundant fan, the Health Driver does the following:

- Displays a message to the console stating the problem.
- Makes an entry in the system health log and the operating system log.
- Shuts the system down (optionally) to avoid hardware damage.

Use RBSU to control the shutdown option.

If a secondary or redundant fan is present when a fan fails, the Health Driver does the following:

- Activates the redundant fan if not already running.
- Displays a message on the console.
- Makes an entry in the system health log and the operating system log.

Monitoring the system fault tolerant power supply

If the server contains a redundant power supply, the power load is shared equally between the power supplies. Check the status of the power supplies by displaying the `/proc/cpqpwr` file system entry. If a primary power supply fails, the server automatically switches over to a backup power supply. The Health Driver does the following:

- Monitors the system for power failure and for physical presence of power supplies.
- Reports when the power supplies experience a change in shared power load.
- Displays a message to the console stating the problem.
- Makes an entry in the system health log and the operating system log.

ECC memory monitoring and advanced memory protection

If a correctable ECC memory error occurs, the Health Driver logs the error in the health log, including the memory address causing the error. If too many errors occur at the same memory location, the driver disables the ECC error interrupts to prevent flooding the console with warnings (the hardware automatically corrects the ECC error). On servers with AMP, the driver will attempt to log an error if a memory board has been inserted, removed, or incorrectly configured, and optionally if an Online Spare Switchover or Mirrored Memory engaged event occurs.

The Health Driver does the following:

- Displays a message on the console stating the problem
- Makes an entry in the system health log

This server feature is configured using RBSU. On ProLiant servers that do not support AMP mirroring, an uncorrectable (double bit) memory error will cause the operating system to halt abruptly. Logging of the error may not be possible if the error occurs in memory used by the Health Driver.

Automatic server recovery

Automatic Server Recovery (ASR) is configured using RBSU available during the initial boot of the server by pressing the F9 key when prompted. This feature is implemented using a "heartbeat" timer that continually counts down. The driver frequently reloads the counter to prevent it from counting down to zero. If the ASR counts down to zero, it is assumed that the operating system has locked up and the system will automatically attempt to reboot. Events which may contribute to the operating system locking up include:

- A peripheral device – such as a Peripheral Component Interconnect Specification (PCI) adapter – that generates numerous spurious interrupts when it fails.
- A high priority software application consumes all the available central processing unit (CPU) cycles and does not allow the operating system scheduler to run the ASR timer reset process.
- A software or kernel application consumes all available memory, including the virtual memory space (for example, swap). This may cause the operating system scheduler to cease functioning.
- A critical operating system component, such as a file system, fails and causes the operating system scheduler to cease functioning.
- Any other event besides an ASR timeout that causes a Non-Maskable Interrupt (NMI) to be generated.

The ASR feature is a hardware-based timer. If a true hardware failure occurs, the Health Driver might not be called, but the server will be reset as if the power switch were pressed. The ProLiant ROM code may log an event to the IML when the server reboots.

The Health Driver is notified of ASR timeout through a NMI. If possible, the driver will attempt to perform the following actions:

- Displays a message on the console stating the problem
- Makes an entry in the IML
- Attempts to gracefully shut down the operating system to close the file systems

There is no guarantee that the operating system will gracefully shutdown. This shutdown depends on the type of error condition (software or hardware) and its severity. The Health Driver logs a series of messages when an ASR event occurs. The presence or absence of these messages can provide some insight into the reason for the ASR event. The order of the messages is important, since the ASR event is always a symptom of another error condition.

The messages identified in Table 4 might be logged if an ASR event occurs:

Table 4. ASR event messages

Message 1	"NMI - Automatic Server Recovery timer expiration - Hour %d - %d/%d/%d"	
	Description	This message indicates that the Health Driver detected an ASR timeout and is attempting to gracefully shut down the operating system. Absence of this message may indicate a critical hardware failure (such as a non-correctable ECC error on a memory DIMM) or some other severe event. This is the first of a series of messages displayed to the console. This message will not be logged to the IML and most likely will not be listed in any system logs.
	Recommended Action	Review all the messages logged to the IML to see if any previous errors have been logged (for example, a corrected single-bit memory error might have been logged).

Message 2	"ASR Lockup Detected: %s"
Description	This message indicates that the Health Driver detected an ASR timeout and is attempting to gracefully shutdown the operating system. Absence of this ASR message may indicate a critical hardware failure (such as a non-correctable ECC error on a memory DIMM) or some other severe event. This will be the first ASR message logged to the IML (if logging is possible).
Recommended Action	Review all the messages logged to the IML to see if any previous errors have been logged.
Message 3	"casm: ASR performed a successful OS shutdown"
Description	This ASR message indicates that the Health Driver detected an ASR timeout and has gracefully shut down the operating system. Absence of this message may indicate a hardware failure (such as a non-correctable ECC error on a memory DIMM), a high priority process consuming all the available CPU cycles (software failure) or possibly that a device, such as a storage or network controller is flooding the system with interrupts. This will be the second ASR message logged to the IML if logging is possible.
Recommended Action	If this ASR message is present, this usually indicates a software type error such as a high priority process consuming all the available CPU cycles. Linux tools, such as SAR (system activity report) can be used in conjunction with the ASR facility to locate the process causing the problem.
Message 4	"ASR Detected by System ROM"
Description	This message indicates that the ProLiant Server ROM detected an ASR timeout. This message is almost always present in the IML when an ASR timeout occurs. If this is the only ASR message logged to the IML, this may indicate a hardware failure (such as a non-correctable ECC error on a memory DIMM). The ASR feature on a ProLiant server will hard reset the server when the timeout expires, with no software intervention required.
Recommended Action	If this is the only ASR message present, this usually indicates a hardware type error (such as an unrecoverable memory error). Try moving the server memory DIMMs to different slots to see if more information can be logged. Review all IML messages that previously occurred to see if any other component has given an indication of failure or temperature limits that might have exceeded normal operating thresholds.

HP Memory Hot Plug Driver

Included in the hpasm package is the HP Memory Hot Plug Driver (cmhp) that provides the added functionality of Hot Plug memory. Even though certain ProLiant servers do have Hot Plug Memory functionality, none of the Linux distributions currently ship kernels that support this feature. To address this issue, HP has developed a patch for the Virtual Subsystem and an intermediate driver called the Hot Add Memory (HAM) Driver that can be used in conjunction with the cmhp module to provide this functionality.

Refer to the following file for server and OS configuration information once the hpasm package is installed: `/opt/Compaq/cpqheatlh/cmhp/cmhp_README`.

Console messages

When events occur outside of normal operations, the Health Driver may display a console message or log a message to the IML. Operational messages, such as fan failures or temperature violations, are logged to the standard `/var/log/messages` file. Messages specific to device drivers (such as NMI type messages) can be viewed using `dmesg`, if the system is not completely locked up. Device driver messages are also logged to the IML.

The hpasm man page documents how to interpret the messages produced by the Health Driver.

HP Integrated Management Log Viewer

The information in the IML may also be leveraged through the IML Viewer application, which resides in the RPM file. The IML records system events, critical errors, power-on messages, memory errors, and any catastrophic hardware or software errors that typically cause a system to fail. The IML Viewer allows the manipulation of this data.

Running the IML Viewer

The IML Viewer is an application that runs in both an X Windows and text (terminal) environment. Type the following to run the IML Viewer:

```
cpqimlview
```

The IML Viewer automatically displays the current entries in the IML. The graphical X Windows version is shown in Figure 1.

Figure 1. IML Viewer Event entries

Description	Class	Severity	Count
IML Cleared (iLO user: Administrator)	Maintenance Note	Caution	1
Power Enclosure Invalid Topology - Check Cabling	Infrastructure Environment	Caution	1
Power Enclosure Invalid Topology - Check Cabling	Infrastructure Environment	Repaired	1
Power Enclosure Invalid Topology - Check Cabling	Infrastructure Environment	Caution	1
Power Enclosure Invalid Topology - Check Cabling	Infrastructure Environment	Repaired	1
Power Enclosure Invalid Topology - Check Cabling	Infrastructure Environment	Caution	1
Power Enclosure Invalid Topology - Check Cabling	Infrastructure Environment	Repaired	1
Server Blade Enclosure Server Blade Removed (Slot 6, Enclosure Serial Number D2000JTK0002)	Infrastructure Environment	Information	1
Server Blade Enclosure Server Blade Inserted (Slot 6, Enclosure Serial Number D2000JTK0002)	Infrastructure Environment	Information	1
Server Blade Enclosure Server Blade Removed (Slot 7, Enclosure Serial Number D2000JTK0002)	Infrastructure Environment	Information	1
Server Blade Enclosure Server Blade Inserted (Slot 7, Enclosure Serial Number D2000JTK0002)	Infrastructure Environment	Information	1
Server Blade Enclosure Server Blade Removed (Slot 8, Enclosure Serial Number D2000JTK0002)	Infrastructure Environment	Information	1
Server Blade Enclosure Server Blade Inserted (Slot 8, Enclosure Serial Number D2000JTK0002)	Infrastructure Environment	Information	1

IML Log entries:
Double click to see a full description of the event.

Legend: Critical/Failed (red), Caution (yellow), Information (blue), Repaired (green)

HP logo and 'invent' tagline

Each event in the IML Viewer has one of the following statuses to identify the severity of the event:

- Information—presents general information about a system event.
- Repaired—indicates that this entry has been repaired.
- Caution—indicates that a non-fatal error condition has occurred.
- Critical/Failed—indicates that a component of the system has failed.

The severity of the event and other information in the IML Viewer helps to quickly identify and correct problems, thus minimizing downtime. The IML Viewer allows several capabilities to enhance the ability to identify, correct, and document server health.

Table 5 describes the menu options available.

Table 5. IML Viewer Menu options

	Option	Description
File menu	Option	Open a previously saved file and display the contents in the IML Viewer.
	Save As	Save the current entries of the IML to a file. This operation does not affect the current contents of the IML. It allows archival of IML data for input into a text editor, spreadsheet application, or IML Viewer for use when working with HP to diagnose issues. The File Name entry should specify the full path for the desired file name. If no path is specified, the file will be saved in the current directory.
	Exit	Close the IML Viewer window and exit the application.
Log menu	Clear All Entries	Clear the IML. Note: HP recommends saving the current contents into a file before emptying the log.
	Mark As Repaired	Mark a specific entry as repaired.
	Add Maintenance Note	Mark a specific entry with maintenance information.
View menu	Filter	Filter IML events to display only desired event types. Event types such as Class, Status, Update Time, and Initial Time can be used to filter IML events.
	Refresh Now	Re-read and re-display entire current IML.
	Sort Events	Sort IML events by event types; for example, sort by Description, Class, Status, Count Initial Time, Update Time, or ID.

Accessing web-enabled ProLiant Management Agents

The Web-enabled ProLiant Management Agents allow you to view subsystem and status information from a Web browser, either locally or remotely.

- To view data locally, use one of the following URLs:

<http://127.0.0.1:2301/>

<http://localhost:2301/>

- To view data remotely, use the following URL:

<http://machine:2301/>

where machine is the IP address or the computer name under DNS

Note

Notice that the URL is followed by: 2301. This is the port or socket number that the Web-enabled ProLiant Management Agents for Servers use to communicate with the browser. If this number is not specified, your browser might attempt to connect to another Web page if the managed server is running a Web server.

After you enter the URL, the security certificate will be visible and the URL will redirect to a secure connection on port 2381.

Device homepage

The Device Homepage is the first page displayed when you access the device at port 2301. This page displays available Web-enabled services. Anonymous access to information is available without logging in when the System Management Homepage is launched for the first time. To log in as a different user, click the **Anonymous** link and the login screen will display.

Security

The Web-enabled ProLiant Management Agents for Linux allow SNMP sets for some system parameters. There are no predefined passwords for the default web agent user accounts in Linux. They must be set or the web agent will not work.

Table 6. Predefined accounts

Account	User name	Password
anonymous	anonymous	none predefined
user	user	none predefined
operator	operator	none predefined
administrator	administrator	none predefined

Note

Predefined accounts are the only user accounts available in this release.
Only the password can be changed.

There are three types of data: Default (read only), Sets (read/write), and Reboot (read/write). The *.INI file located in /opt/compaq/webagent contains the configuration files used by the Web-enabled ProLiant Management Agents. The Web-enabled ProLiant Management Agents daemon must be stopped and restarted for any changes to take effect. Do not modify anything except the read/write levels to change the security.

Viewing subsystem and status information

Select **Insight Management Agent** from the Device Homepage to view subsystem and status information for the device. This section describes how to navigate through this management information.

The date and time displayed at the top of the page shows when (in the local time) the page was last received by the Web browser. To refresh this frame, click the Refresh link at the top of the page.

Title frame

The Title frame, located in the upper-left corner of the browser window, displays the following links:





- Agent Help—navigates to the Help file.
- Summary—navigates quickly back to the list of degraded or failed components on the Summary Page.
- Device Home—returns to the Device Homepage.
- Options—accesses the Options Page and sets options for Display Mode (frames or no frames), Help icons, and Auto Refresh intervals.

Summary page

The first Summary page displays the device name, type, contact information, location, and IP address, as well as a list of failed or degraded items. To view detailed information about a failed or degraded item, click the item.

The colored ball and square icons next to the individual items in Table 7 indicate the status of each item.

Table 7. Status indicators

Icon	Color	Status
	blue	Device status is unknown.
	green	Device status is OK.
	yellow	Device status is degraded.
	red	Device status is failed.

Note

In the no-frames version of this software, the Summary page fills the entire browser window. Each subsequent page contains similar information to the Title Frame at the top with links to Help, Summary, Device, Home, and Options pages. The Summary page in the no-frames version displays all device categories and items within each category that are sorted by status. To view detailed information about an item, click the item.

Navigation frame

The Navigation frame, located below the Title frame on the left side of the browser window, lists all of the subsystems with components that are available for the devices. The colored ball and square icons next to the various items in the list indicate the status of those items. A legend for the colored balls is displayed at the bottom of the frame. Select a component in the left frame to display details in the right frame.

Data frame

The Data frame comprises the remainder of the browser window and displays detailed information about the selected items. This window also displays the Summary page when the Summary option is selected from the Title frame.

Note

Some items may split the Data frame into subframes that follow the same organizational structure as the Main frame. The structure includes navigation data in a subframe on the left and detailed information in a subframe on the right.

Peer Agents

The Peer Agents extend the SNMP "enterprise" Management Information Base (MIB) to include Foundation and Server MIB data. The Peer Agents support SNMP get, set, and trap operations on data items defined in the Host and Threshold MIBs.

At SNMP agent startup, the Host and Threshold MIBs in `/opt/compaq/foundation/etc/cmafdtnobjects.conf` are read by `cmaX` and registered with the SNMP agent. The Health, Standard Equipment, and Remote Insight MIBs in the file `/opt/compaq/server/etc/cmasvobjects.conf` are also read by `cmaX` and registered with the SNMP agent.

During installation, the Peer Agents are configured to start automatically when the SNMP agent is running. Linux run-level configuration tools can be used to change Peer Agent configurations. They should be started after the SNMP agent `snmpd` is started and should be killed after `snmpd` is killed.

The Foundation Peer Agent can be started or stopped manually by issuing the following commands:

```
#/opt/compaq/foundation/etc/cmafdtn start cmafdtnpeerd
#/opt/compaq/foundation/etc/cmafdtn stop cmafdtnpeerd
```

The Server Peer Agent can be started or stopped manually by issuing the following commands:

```
#/opt/compaq/server/etc/cmasvr start cmasvrpeerd
#/opt/compaq/server/etc/cmasvr stop cmasvrpeerd
```

ProLiant Management Agent configuration file

The ProLiant Management Agents Configuration file, `/opt/compaq/cma.conf`, is shared by all HP ProLiant Management Agents packages. Currently, only trap email notification configuration and base socket number (used by `cmaX`) are supported. The agents are capable of sending email notifications in addition to SNMP traps. The `trapemail` entries in `/opt/compaq/cma.conf` configure the email commands, which are then read by the Peers software during their initialization.

If `trapemail` entries are edited, the Peers software must be restarted before the configuration modification is effective. The command to restart the agent is:

```
#/etc/init.d/hpasm restart agent
```

The syntax of the `trapemail` lines is as follows:

```
trapemail mail_command
```

The keyword "trapemail" indicates that the rest of the line is the command for sending trap email. In `mail_command`, you must provide the full path of your email command, the subject, and the recipients.

Multiple `trapemail` lines may be defined in `/opt/compaq/cma.conf`. A default line will be added during installation if none exists:

```
trapemail /bin/mail -s 'HP Insight Management Agents Trap Alarm' root
```

The `mail_command` can be any Linux command that reads standard input. For example, using `trapemail /usr/bin/logger` will log trap messages to system log file (`/var/log/messages`).

The `cmaXSocketBase` entry in configuration file `/opt/compaq/cma.conf` configures the starting socket port used for communications between `cmaX` and Peers. The entry is not needed unless the "bind() failed!" message displayed in the Agents log file `/var/spool/compaq/cma.log`.

This entry should be listed in the configuration file as follows:

```
cmaXSocketBase 12345
```

If cmaXSocket Base entry is edited, the snmpd and Peers software must be restarted before the configuration modification is effective. You can do this by entering the following commands:

```
#/etc/init.d/snmpd restart
#/etc/init.d/hpasm restart agent
```

Data Collection Agents

Data Registries are composed of standard Linux directories and associated files. Each file in the data registry is a logical object containing "n" related data items.

The MIB items supported by the Foundation Data Collection Agents are listed in the /opt/compaq/foundation/etc/cmafdrnobjects.conf file. The MIB items supported by the Server Data Collection Agents are listed in the /opt/compaq/server/etc/cmasvobjects.conf file.

The command line arguments in Table 8 are used with the Data Collection Agent executables.

Table 8. Command line arguments

Command line argument	Description
-p poll_time	Specifies the number of seconds to wait between data collection intervals. The default is 15 seconds. The minimum value allowed is 1 second. The maximum value allowed is 60 seconds. This argument is required.
-s set_state	Specifies whether SNMP set commands are allowed for this agent. A set_state of OK means that SNMP set commands are allowed. A set_state of NOT_OK means that SNMP set commands are not allowed. Default set_state is OK.
-t trap_state	Specifies whether SNMP trap commands are allowed for this agent. A trap_state of OK means that SNMP trap commands are allowed. A trap_state of NOT_OK means that SNMP trap commands are not allowed. Default trap_state is OK.

During installation, each agent is configured to start automatically after SNMP Agent (snmpd) is started and to stop after snmpd is stopped.

Host OS Agent

The Host OS Agent gathers data for the Host OS MIB, including:

- Server/host name and operating system version number
- Processor utilization information (for each processor) over 1-minute, 5-minute, 30-minute, and 60-minute intervals
- Linux file system information (for each mounted file system)
- Software version information

The Host OS Agent executable is /opt/compaq/foundation/bin/cmahostd.

The Host OS Agent can be started and stopped manually by typing the following commands:

```
#/opt/compaq/foundation/etc/cmafdrn start cmahostd
#/opt/compaq/foundation/etc/init.d/cmafdrn stop cmahostd
```

Threshold Agent

The Threshold Agent implements the Threshold MIB. Users can set thresholds on counter- or gauge-type MIB variables. The Threshold Agent periodically samples each selected MIB variable at a rate defined by the user.

MIB data values are compared to user-configured thresholds. If a configured threshold is exceeded, an alarm trap is sent to the configured SNMP trap destination and to Linux email (configurable through trapemail entries in /opt/compaq/cma.conf file). User-configured alarm thresholds are permanently saved in the data registry until deleted by the user.

For more information on threshold configurations, refer to the *HP Systems Insight Manager Help file*. This guide can be found on the Management CD or on the HP website at www.hp.com/go/hpsim.

The Threshold Agent executable is /opt/compaq/foundation/bin/cmathreshd.

The Threshold Agent can be started and stopped manually by typing the following commands:

```
#/opt/compaq/foundation/etc/cmafdtn start cmathreshd
#/opt/compaq/foundation/etc/cmafdtn stop cmathreshd
```

The Threshold entries can be removed by following this procedure:

1. To stop the Threshold Agents, run the Foundation Agents stop script by typing:

```
#/opt/compaq/foundation/etc/cmafdtn stop cmathreshd
```

2. Delete the threshold entries from the Threshold Data Registry file by typing:

```
#rm /var/spool/compaq/foundation/registry/threshold/entry*
```

3. Run the Foundation Agents start script to start the Threshold Agent by typing:

```
#/opt/compaq/foundation/etc/cmafdtn start cmathreshd
```

Web Agent

The Web Agent runs as a daemon and converts SNMP information into HTML format so that it can be viewed from a Web browser. The Web Agent provides Web pages containing management information about HP servers.

The Web Agent allows users to view subsystem and status information of HP servers from a Web browser, either locally or remotely. The Web Agent also provides extensive Set capabilities. Refer to the Web-Enabled ProLiant Management Agents User Guide for more information about the Web Agent. This guide can be found on the Management CD at /docs/eng/imaug.pdf.

The Web agent executable is /opt/compaq/foundation/bin/cmawebd.

The Web Agent can be started and stopped manually by typing the following commands:

```
#/opt/compaq/foundation/etc/cmafdtn start cmawebd
#/opt/compaq/foundation/etc/cmafdtn stop cmawebd
```

Standard Equipment Agent

The Standard Equipment Agent gathers data for the Standard Equipment MIB. The data includes:

- PCI slot information
- Processor and coprocessor information
- Standard peripheral information (serial ports, diskette drives, and so on)

The Standard Equipment Agent executable is /opt/compaq/server/bin/cmastdeqd.

The Standard Equipment Agent is started and stopped manually by typing the following commands:

```
#/opt/compaq/server/etc/cmasvr start cmastdeqd
#/opt/compaq/server/etc/cmasvr stop cmastdeqd
```

System Health Agent

The System Health Agent gathers data for the Health MIB. The data collected include critical (NMI) errors, correctable memory (ECC) errors, system hang/panic detection, temperature conditions, and fan failures. The System Health Agent then retrieves these errors from the Health Driver.

The System Health Agent executable is `/opt/compaq/server/bin/cmahealthd`.

The System Health Agent can be started and stopped manually by typing the following commands:

```
#/opt/compaq/server/etc/cmasvr start cmahealthd
#/opt/compaq/server/etc/cmasvr stop cmahealthd
```

Troubleshooting

This section describes common problems that might occur during installation and operation of the hpasm package. In most cases, a workaround is available and described in Table 9. Any problems reported to HP should include the following files:

- `/var/log/messages`
- `/var/log/boot` (for Red Hat Linux distributions)
- `/var/log/warn` (for SUSE LINUX distributions)
- `/var/log/dmesg` (for Red Hat Linux distributions)
- `/opt/compaq/cpqhealth/cpqhealth_boot.log`
- `/opt/compaq/cpqhealth/cpqhealth_boot.log.old` (if it exists)

Table 9. Known issues

Issue 1	Non-certified machines
Symptom	When the hpasm RPM file is installed, the following message displays: casm: This driver is not supported on this system The driver is not inserted into the list of modules.
Cause	The Health Driver cannot be initialized at this time due to a conflict in ROM internal tables or the server is not supported. This driver is only supported on servers that have the ProLiant Advanced Server Management (ASM) ASIC (PCI identifier 0x0e11a0f0 or the Integrated Lights-Out Management ASIC (PCI identifier 0x0e11b203)). No other ProLiant servers are supported. Verify that the appropriate ASM ASIC is present. Use the following commands to perform the check: <pre>cat /proc/bus/pci/devices grep -i 0e11a0f0 cat /proc/bus/pci/devices grep -i 0e11b203</pre> One of these commands should succeed and return information. Also, check to see if a later ROM version is available for this server.
Workaround	There is no workaround, since this driver functions as designed.
Issue 2	Health Driver does not install or boot correctly
Symptom	When the Health Driver's RPM file is installed, error messages are logged to the console and the <code>/opt/compaq/cpqhealth/cpqhealth_boot.log</code> file indicates the installation was not successful.
Cause	The hpasm RPM only ships binaries for standard "out of the box" kernels. The installation and boot scripts, however, are intelligent. If kernel symbol mismatches are detected, the scripts will seek out the appropriate kernel source libraries and attempt to automatically rebuild.

Workaround

The following numbered list is not an exhaustive list, but it should provide you with insight into the possible symptoms and causes. The gcc compiler, linker, insmod, etc., might generate other messages. If the Linux kernel of the server is very different from the boxed (or shipping) Linux kernel, some modification to the Linux wrapper (source) module may be required. If Linux kernels other than distributed errata kernels are installed, the administrator is expected to have C programming and Linux device driver development skills to be able to work any issues.

1. The following message is an indication that the binary module shipped with the RPM package does not match the installed kernel:

"The HP Health Event Logging module failed to load!"

"Linux Kernel Symbol Conflict - Attempting rebuild to resolve"

In response, the boot script (/etc/init.d/cpqasm) will automatically attempt to locate the matching source, rebuild the wrapper code and link the driver to the current kernel.

The gcc compiler or linker errors usually precede the message:

"WARNING! The hpasm RPM is not compatible with this kernel."

"See /opt/compaq/cpqhealth/cpqhealth_boot.log."

All messages are saved in the /opt/compaq/cpqhealth/cpqhealth_boot.log file. If the Linux kernel symbols have had significant modifications since the last released kernel, you may have to resolve some issues in the following wrapper files:

/opt/compaq/cpqhealth/casm.d/casmw_linux.c

/opt/compaq/cpqhealth/cevt.d/cpqevtw_linux.c

2. The following message is an informational message to indicate which Linux kernel has been detected and to let the user know that the rebuild process has begun:

"Looking for sources to build \${THIS_KERNEL}"

3. The following message indicates that the sources to match the installed (or booting) Linux kernel version cannot be located:

"/lib/modules/\${THIS_KERNEL}/build does not exist."

"This is an indication that the sources for this kernel (\${THIS_KERNEL}) are not loaded."

"Please load the appropriate sources to rebuild module."

The directory structure listed in the previous message is the standard directory structure established by all Linux kernel 2.4 releases.

4. The following message indicates that the required include file, version.h, cannot be located on this system:

"/lib/modules/\${THIS_KERNEL}/build/include/linux/version.h does not exist."

"Please load the appropriate sources to rebuild module."

This message is usually an indication that a patched kernel without the matching Linux kernel (patch) sources being loaded.

5. The following message indicates that the required include file, autoconf.h, cannot be located on this system:

"/lib/modules/\${THIS_KERNEL}/build/include/linux/autoconf.h does not exist"

Please load the appropriate sources to rebuild module."

This message is usually an indication of a patched kernel without the matching Linux kernel (patch) sources being loaded.

6. The following message indicates that the required include file, version.h, has been located on this system, but the version number inside does not match the current (or booting) Linux kernel:

"/lib/modules/\${THIS_KERNEL}/build/include/linux/version.h does not match the version of this kernel (\${THIS_KERNEL})."

"This is an indication that a patch has been loaded but not the sources to match the running kernel. This driver requires the sources to all kernel patches to be loaded in order to relink to the kernel symbols."

This message usually indicates that a patched kernel without the matching Linux kernel (patch) sources being loaded.

7. The following message indicates that the matching source files for the current (or booting) Linux kernel could not be found:

"There does not appear to be kernel sources which match the current booting Linux kernel."

"There must be a directory named `\"/lib/modules/${THIS_KERNEL}\"` and there must be a valid directory linked to `\"/lib/modules/${THIS_KERNEL}/build\"`."

"Please load the appropriate Linux sources to rebuild module."

The previous message describes how the source directory must look.

8. The following message indicates that a compile and link of the cpqevt driver into the kernel appears to have been successful. This logs the replacement of the shipping driver:

"Replacing \${CPQEV} at \${MY_DATE} . . ."

"Custom cpqevt Driver installed . . ."

"Reloading the hp ProLiant Advanced Server Management Event module . . ."
9. The following message indicates that a compile and link of the Health Driver into the kernel appears to have been successful. This message logs the replacement of the shipping driver:

"Replacing \${CPQASM} at \${MY_DATE} . . ."

"Custom cpqasm Driver installed . . ."

"Reloading the hp ProLiant Advanced Server Management Event module . . ."
10. The following message indicates that the rebuild of the driver did not succeed:

"WARNING! The hpasm RPM is not compatible with this kernel."

"Remove and install again the hpasm RPM to correct."

"See `/opt/compaq/cpqhealth/cpqhealth_boot.log` for details."

In this case, try to remove and install the hpasm RPM to see if this will correct the problem. Also, view the `/opt/compaq/cpqhealth/cpqhealth_boot.log` file for further information.

Issue 3	The hpasm package custom build does not work	
	Symptom	The hpasm_rebuild script logs messages to the console and exits.
	Cause	You must execute the custom build script as user name "root." The RPM must be available to you and you should start the script with the version of the package that you installed (for example 6.30.0).
	Workaround	Install RPM and make sure it is available from your PATH variable.
Issue 4	No console messages	
	Symptom	No console messages appear on the text screens (for instance, Ctrl+Alt+F1), but the error messages get logged properly in <code>/var/log/messages</code> . If you run KDE or Gnome, xterms will not show the console messages originating from the Health Driver.
	Cause	The syslogd daemon is configured somewhat differently than other distributions; the system messages will not appear on the lower digit terminals (tty1-9).

Workaround		<p>If you do not want the message to be logged on the system, configure it differently by modifying <code>/etc/syslog.conf</code> in the following way:</p> <pre># Log all kernel messages to the console. # Logging much else clutters up the screen. kern.* /dev/console # Log anything (except mail) of level info or higher. # Don't log private authentication messages! *.info;mail.none;news.none;authpriv.none /var/log/messages</pre> <p>After sending a HUP signal to syslogd process ID, you should see your kernel messages appearing on all consoles.</p> <pre>kill -1 <pid of syslogd></pre>
Issue 5	Failure in cpqimlview	
Option a	Symptom	<p>When starting cpqimlview, the IML Viewer, you may see the following message:</p> <pre>"ERROR: tclX not installed. tclX must be installed to use the IML viewer."</pre>
	Cause	The IML Viewer is a tcl-based application, so it will not compile or run if this package is not present.
	Workaround	Install the tclx RPM package (for example, tclx-8.2.0-32).
Option b	Symptom	<p>When starting cpqimlview, the IML Viewer, you may see the following message:</p> <pre>"Cannot open /dev/cdt. Wellness driver may not be installed."</pre> <p>Once this error message appears, the IML is not functioning.</p>
	Cause	The problem lies in the fact that the Health Driver is not inserted on your system. A reason could be that your system is not certified for the current version of the hpasm package.
	Workaround	<p>Try removing the hpasm package and reinstalling it.</p> <pre>rpm -e hpasm rpm -ivh hpasm-<version>.<distribution>.i386.rpm</pre> <p>This workaround will insert the Health Driver (verify by typing <code>lsmod</code>). If the driver is not working, the system is not certified for the hpasm package.</p>
Issue 6	Superuser only	
	Symptom	<p>You will experience the following problems:</p> <ul style="list-style-type: none"> • Commands like <code>insmod</code>, <code>modprobe</code>, <code>rmmod</code>, or <code>rpm</code> are not available. • The RPM install will fail because file permissions are being denied (see below). <pre>"Failed to open //var/lib/rpm/packages.rpm error: cannot open //var/lib/rpm/packages.rpm"</pre> • The command <code>cpqimlview</code> is not known or fails because of file permissions.
	Cause	Preparing a driver install necessitates access to system administrator rights.
	Workaround	Be sure to log in as "root" before you attempt the driver install.

Issue 7	Several agents do not appear in the process listing	
	Symptom	When listing out processes (for instance with <code>ps -ef</code>), some agents do not appear.
	Cause	Agents may not run on all ProLiant servers. For instance, the process <code>cmarrackd</code> will only appear on ProLiant BL p-Class servers. Other causes could be that some management driver failed to load or that SNMP is not present or not running on the system.
	Workaround	<p>Try to restart everything by typing:</p> <pre># /etc/init.d/hpasm stop driver # /etc/init.d/hpasm start agent</pre> <p>If the problem persists, check the log contained in <code>/opt/ompaq/cma.log</code> for clues and contact your HP field service engineer.</p>
Issue 8	The agents do not seem to expose their data through SNMP; my management console does not see any status	
	Symptom	Through SNMP browsers or other management software, the servers appear dead. No SNMP traffic is available through them.
	Cause	<p>This can be caused by many things. Here is a checklist of the most common problems:</p> <ul style="list-style-type: none"> • SNMP is not running. • The agents and/or drivers have not started properly (see item 7). • The <code>snmpd.conf</code> file is misconfigured. <ul style="list-style-type: none"> – <code>rwcommunity</code> is undefined for either <code>localhost</code> or the management console. – <code>community</code> string mismatches the one from the management console. – <code>trapsink</code> or <code>trapcommunity</code> is undefined. <code>Trapcommunity</code> may be undefined for <code>localhost</code>. • Firewalling software is enabled on the system and set up to block SNMP traffic. • The <code>cmaX</code> extension is absent from the <code>snmp</code> stack.
	Workaround	<ul style="list-style-type: none"> • Install and start <code>snmp</code>. • Install and start the ProLiant Management Agents. • A sample configuration file could look like this: <pre>rwcommunity public localhost rwcommunity public your.management.console trapcommunity public trapsink your.management.console public trapsink localhost public</pre> <p>Note: The example above would assume that your community string is "public" and "your.management.console" is the domain name of your management console.</p> <ul style="list-style-type: none"> • Disable the firewall (<code>iptables</code>/<code>ipchains</code> need to be turned off). • Download the <code>ucd-snmp</code> stacks that HP provides that have the <code>cmaX</code> extension built in.

HP Lights-Out Drivers and Agents

The HP Lights-Out Drivers and Agents package contains the following drivers and agents:

- Remote Insight Driver
- iLO Management Interface Driver
- Rack Infrastructure Interface Service

- Remote Insight Board Agent (formerly in the Server Agents package)
- Rack Agent (formerly in the Server Agents package)

The Remote Insight Driver enables the routing of SNMP traffic out of the Remote Insight Lights-Out Edition and Remote Insight Lights-Out Edition II adapters. These adapters are equipped with an integrated network interface card (NIC) that is used to manage the card through its Web interface or through Systems Insight Manager. A further task of the driver is to expose the IML of the system through the management adapters.

The adapter itself operates without any additional driver (for example, the Remote Log In and Virtual Floppy features are available). The driver only enhances the capabilities of the adapter.

Integrated Lights-Out allows browser access to ProLiant servers through a seamless, hardware-based graphical Remote Console, Virtual Power Button, and Virtual Floppy. This functionality does not require an OS driver.

The iLO Management Interface Driver enables iLO data collection and integration with the ProLiant Management Agents and the rack infrastructure interface service. The driver enables communication routing of SNMP traffic from the ProLiant Management Agents through the dedicated iLO management NIC.

The Remote Insight Agent gathers data for the Remote Insight MIB. The data includes:

- Configuration and statistical information for the Remote Insight Board (RIB/RILOE)
- Events logged on to the RIB
- Configuration and statistical information for the Remote Insight NIC

The Rack Agent monitors the rack through the systems management microprocessor on the server, the microprocessor on the server enclosure, and the microprocessor on the power enclosure.

The ProLiant Rack Infrastructure Interface Service enables communication through the Integrated Lights-Out Management Component to the rack infrastructure.

Management hardware

The Remote Insight Driver is supported on the Remote Insight Lights-Out Edition and Remote Insight Board Lights-Out Edition II adapters. Documentation on these adapters can be found at www.hp.com/servers/manage.

For documentation on Integrated Lights-Out, which is supported by the iLO Management Interface Driver, visit <http://h18013.www1.hp.com/manage/ilo-description.html>.

Refer to the QuickSpecs for each product to determine the servers and operating systems supported.

Setup procedures

This section covers prerequisites for installation and procedures for installing, upgrading, and removing the HP Lights-Out Drivers and Agents for Linux (RSM) RPM.

Prerequisites

The hpsrm RPM requires the HP Server Management Drivers and Agents to be installed first.

Important

For advanced troubleshooting with errata kernels, please view the appropriate HOWTO located at <http://h18000.www1.hp.com/products/servers/linux/documentation.html>.

The hpasm and hprsm RPMs can be obtained at <http://h18000.www1.hp.com/products/servers/linux/softwaredrivers.html>.

You can check for the presence of the hpasm RPM by typing:

```
% rpm -q hpasm
```

Note

The command above should return the package name and version if it is installed.

You can check if the Health Driver is running by typing:

```
% lsmod
```

Note: Look for cpqasm in the list.

Installing the drivers and agents

If you have a previous version of the Remote Insight Lights-Out Edition Driver, the Integrated Lights-Out Driver, the Rack Infrastructure Interface Service, or the ProLiant Management Agents installed, you must uninstall these components before installing the new RPM file.

1. To determine if these components are loaded, type the commands listed in Table 10 for each component.

Table 10. Loaded components

Component	Command
Remote Insight Lights-Out Edition (cpqrid) Driver	<pre>% insmod cpqrid.o</pre>
Integrated Lights-Out (cpqci) Driver	<pre>% insmod cpqci.o</pre>
Rack Infrastructure Interface Service	<pre>% ps -ef grep cpq</pre> <p>Note: Look for /sbin/cpqriisd/ in the list.</p>
ProLiant Management Agents	<pre>% ps -ef grep cma</pre> <p>Note: Look for cmasm2d and cmarackd in the list. Only the ProLiant BL p-Class server blades will display cmarackd.</p>

2. To remove these packages, type:

```
% rpm -e cmasvr
% rpm -e cpqriis
% rpm -e cpqci
% rpm -e cpqrid
```

3. To install the hprsm RPM, type the following at the command prompt:

```
% rpm -ivh hprsm-<version>.<distribution>.i386.rpm
```

The RPM file has a binary that is compiled for the default kernel of the supported distribution. To install the RPM on a non-default kernel, you must also install the kernel sources for the compiled kernel.

Note

The hprsm RPM will attempt to detect if a RILOE adapter is present before inserting the cpqrid driver. If a RILOE adapter is not present, the RSM RPM will default to the cpqci driver. The default location for the cpqrid module is: `/lib/modules/`uname -r`/kernel/drivers/char/cpqrid.o`. The default location for the cpqci module is: `/lib/modules/`uname -r`/kernel/drivers/char/cpqci.o`.

For more information about these components, refer to the online documentation by typing:

```
%man hprsm
%man cpqrid
%man cpqci
%man cpqriisd
%man cpqblru
```

Upgrading the drivers and agents

If you are upgrading from a previous version of the RSM RPM, type:

```
%rpm -Uvh hprsm-<version>.<distribution>.i386.rpm
```

Removing the drivers and agents

To remove the hprsm RPM, type:

```
%rpm -e hprsm
```

To manually remove the drivers, type:

- For the Remote Insight Lights-Out Edition Driver:

```
%rmmod cpqrid
```

- For the Integrated Lights-Out Driver:

```
%rmmod cpqci
```

Note

Removing the driver by using the `rmmod` command will not prevent the driver from starting up during boot.

Configuring the agents

The Remote Insight Agent executable is `/opt/compaq/server/bin/cmasm2d`.

For Remote Insight Agents to work properly, the localhost (127.0.0.1) requires SNMP READ (get) privileges at a minimum. The localhost SNMP WRITE (set) privileges are required for enabling SNMP WRITE (set) capability in the Remote Insight Agent.

The Rack Agent executable is `/opt/compaq/server/bin/cmarackd`.

The command line arguments in Table 11 can be used with these agents.

Table 11. Command line arguments

Command line argument	Description
-p poll_time	Specifies the number of seconds to wait between data collection intervals. The minimum allowed value is 1 second and the default value is 60 seconds.
-s set_state	Specifies whether SNMP set commands are allowed for this agent. A set_state of OK (default) means that SNMP set commands are allowed. A set_state of NOT_OK means that SNMP set commands are not allowed.
-t trap_state	Specifies whether SNMP trap commands are allowed for this agent. A trap_state of OK (default) means that SNMP trap commands are allowed. A trap_state of NOT_OK means that SNMP trap commands are not allowed.

To start and stop the agents manually, type:

```
%/etc/init.d/hprsm start <agent>
%/etc/init.d/hprsm stop <agent>
```

To create a custom hprsm package, type the following command:

```
/opt/compaq/hprsm/etc/rebuild
```

The completed packages will be copied to the /usr/src/redhat/RPMS/i386 or /usr/src/packages/RPMS/i386 directory. The RPMs are versioned as "CUSTOM" to distinguish these RPMs from the standard drivers.

HP ProLiant Rack Infrastructure Interface Service

The HP ProLiant Rack Infrastructure Interface Service (cpqriis) opens and sustains communication with the Integrated Lights-Out management controller.

This communication link is vital to obtain a connection to the ProLiant BL p-Class enclosure management controllers in the back of the rack. If it is not run, other applications, such as the Rack Upgrade Utility and the Rack Agent, will not work.

The service also receives any type of alerts from the Rack Infrastructure and logs those into the OS logging facility.

Running the service

Once the hprsm RPM is installed, the Rack Infrastructure Interface Service should start immediately, if the server is a ProLiant BL p-Class blade.

This service is started from a run-level script named hprsm. It can be invoked manually by typing:

```
/etc/init.d/hprsm start cpqriisd
or
service hprsm start cpqriisd(for Red Hat Linux distributions)
```


The service is contained in an executable called `cpqriisd` which resides in the `/sbin` directory. It can be invoked by using the commands in Table 12.

Table 12. Commands

Option	Description
-F	This option will "daemonize" the process and will start the daemon up in a production level environment. Usage is recommended. An easier way to accomplish this task is to execute the <code>hprsm</code> run-level script.
-D	This option starts the service in a debug environment. <code>stdin</code> and <code>stdout</code> will go to the console; typing "e" will quit the daemon. Alerts are logged onto the same text console.
-V	This option enables the verbosity of the output. The default behavior is to output to both <code>/var/log/messages</code> and <code>tty1 – tty10</code> .
-?	This option reports the version of the service and informs the user of the other options described above.

The man page for this service may be viewed by typing `man cpqriisd` at the command prompt.

During operation, the service logs events from the infrastructures on `tty1` through `tty10` (if available), as well as `/var/log/messages`. If this produces too much text on the screen, adding the option `"-V0x0"` to the `hprsm` startup script will silence the text.

The service acts as an enabler for other ProLiant value-add software, such as the Rack Agent and the Rack Upgrade Utility.

If the service goes away after a few seconds, there is a failure to initiate communication with the iLO management controller. The failure reason will be logged into the message log. If the service is stopped, dependent applications like the Rack Firmware Upgrade Utility will terminate as well.

Table 13 includes some of the issues you might encounter and descriptions of each.

Table 13. cpqriisd messages

Message 1	Could not setup server semaphores Could not destroy server semaphores Up sem: ioctl Failure ! Down sem: ioctl Failure ! Down sem Down sem: ioctl Failure ! Down sem get sem: ioctl Failure ! set sem: ioctl Failure !	
	Description	These messages indicate that synchronization objects called "semaphores" cannot be set up correctly. This issue is most likely occurred because the iLO driver is absent.
	Recommended Action	Install the iLO driver.
Message 2	Warning: Shared Memory Segment exists Killing process %s pid %d pgid %d	
	Description	These messages indicate that the daemon encountered a shared memory segment that was not cleaned up properly.
	Recommended Action	No action required, since this message is informational. This warning will be removed in a later version of the Rack Infrastructure Interface Service.
Message 3	Multiple copies of this daemon may be running - exiting...	
	Description	This message is an issue with Version 1.0.0 of the Rack Infrastructure Interface Service, which disallows the starting of two copies of the service.
	Recommended Action	Only one copy of the daemon should be running at any time.
Message 4	Setup Shared Memory failed!	
	Description	This message indicates that a common OS resource, "shared memory," is not available. This issue could be due to high utilization, but most likely a memory segment from Version 1.0.0 of this service was left behind erroneously.
	Recommended Action	Install Version 1.1.0-2 of the service.
Message 5	Semaphore %s interrupted in %s Local Semaphore %s interrupted in %s	
	Description	This type of message will be logged if the service is terminated abruptly (for example, through the "kill" command).
	Recommended Action	No action required since this message is informational.
Message 6	Alert only seems to reach %d out of %d client applications	
	Description	The alerts coming from the infrastructure seem to be dispatched to a subset of registered clients only. Most likely, a client terminated suddenly without properly deregistering itself.
	Recommended Action	This message does not indicate a problem with the Rack Infrastructure Interface Service; however, there might be a problem with the HP ProLiant Rack Daemon (cmarackd). Restart cmarackd to verify that the problem persists. If so, contact your HP field service engineer.
Message 7	***ILO exceeded the number of allotted back offs, is it stuck?	
	Description	iLO responds with a "backoff" command indicating a busy state, which is a temporary condition. If this condition lasts too long (5000 tries), the message will appear.

	Recommended Action	Verify that iLO is not under extreme network load, such as a ping flood. Otherwise, contact your HP field service engineer.
Message 8	**Data returned is too short for any transaction **Data returned is too short for regular transaction	
	Description	Data corruption from iLO has occurred. The data received will be ignored.
	Recommended Action	Reboot iLO by navigating to the Network Settings tab in the iLO Web interface and clicking Apply. If you continue to see this message, contact your HP field service engineer.
Message 9	watchdog sees no dispatch threads cpqci watchdog: close channel! cpqci watchdog: reopen channel!	
	Description	These messages indicate that iLO was reset and that the service is trying to reopen communication.
	Recommended Action	No action required, since this message is informational.
Message 10	Problems setting up shared memory Problems setting up semaphores Problems setting up local semaphore Problems setting up watchdog thread Problems setting up IPMI channel Problems setting up dispatch thread Problems setting up secondary dispatch thread Problems setting up dispatch threads Did not receive initial handshake Problems pushing IPMI traffic over channel! Problems setting up dispatch data Problems setting up stats data Problems setting up dynamic mem allocator! Problems setting up hash table! Problems setting up communication with channel! Problems setting up watchdog thread!	
	Description	<p>These messages indicate a problem that occurred during initialization of the service. The main reasons for failure include:</p> <ul style="list-style-type: none"> • Absence of the iLO Driver. • iLO encountered problems and is in an undefined state. • OS is running out of resources (for example, memory, threads, semaphores, etc.).
	Recommended Action	Verify that the iLO Driver is installed and reboot the server.
Message 11	start failed. started and stopped. failed.	
	Description	This message indicates that the service terminated itself because of problems.
	Recommended Action	Install Version 1.1.0-2 of the service. Verify that the iLO Driver is installed and reboot the server. If problems persist, contact your HP field service engineer.
Message 12	Dispatcher still sees %d clients...	
	Description	A client does not respond properly to impending shutdown. Consequently, the service waits for approximately 5 seconds, outputs this message, and exits.
	Recommended Action	No action required since this message is informational. However, this message could also indicate that the HP ProLiant Rack Daemon (cmarackd) has died.

Message 13	Checksum on SEEPROM %2.2x do not match for header (%2.2x)
Description	This message indicates that the EEPROMs in the infrastructure are corrupt.
Recommended Action	Contact your HP field service engineer for resolution.
Message 14	Error: copy ipmb response with negative length %d Error: copy ipmb response with excessive length %d
Description	These messages indicate that a corrupt response from the infrastructure was received.
Recommended Action	Reboot the HP ProLiant Power Module.

Removing the service

The service can be manually stopped by typing:

```
/etc/init.d/hprsm stop cpqriisd
or
% service hprsm stop cpqriisd (for Red Hat Linux distributions)
```

Using the HP ProLiant BL Rack Upgrade Utility

The HP ProLiant BL Rack Upgrade Utility upgrades the firmware on the server blade and power management modules in the rack.

For iLO reflash and firmware upgrade information, refer to the Integrated Lights-Out User Guide located at <http://h18013.www1.hp.com/manage/ilo-description.html>.

```
cpqblru [-eql?] [-a address1,address2,...] [-c chassis1,chassis2,...]
```

Table 14. ProLiant BL Rack Upgrade Utility parameters

Parameter	Description
-a address1,address2,...	This optional parameter considers only enclosures with address1, address2, etc. The list of addresses must be composed of 16-bit quantities separated by commas. The addresses can be obtained by running -q (see below). No white spaces are allowed in between. If no comma-separated list is given, all possible addresses in the rack are considered.
-c chassis1,chassis2,...	This optional parameter considers only enclosures with positions chassis1, chassis2, etc. that are counted from the bottom. The list must be composed of small numbers that are legal positions in the rack. No white spaces are allowed in between the commas and the numbers. A list such as 1,2,5, for instance, would signify the bottom, second-to-bottom, and fifth-to-bottom enclosures.
-e	Disregard the local enclosure (for example, the enclosure containing the server from which we flash) in the flashing. This parameter is given in conjunction with -a or -c.
-l	Disregard anything but the local enclosure (for example, the enclosure containing the server from which we flash). This parameter should not be given with -a or -c.
-q	This parameter queries the chassis positions, their serial numbers, and their firmware status and returns their addresses.

The man page for this utility may be viewed by typing `man cpqblru` at the command prompt.

Please note the following while upgrading ProLiant BL p-Class enclosure management controllers:

- During a flash upgrade, only the primary firmware image is reflashed. All controllers have a backup image. The backup image is used for recovery purposes when a flash upgrade is interrupted or otherwise fails. Restoring the backup firmware image is rarely needed and is covered in the Integrated Lights-Out User Guide located at <http://h18013.www1.hp.com/manage/ilo-description.html>.
- When updating enclosure management controllers in more than one enclosure, the new image must be transmitted twice (first to the local enclosure and second to the remote enclosure(s) using broadcast mode). The update process can take up to 10 minutes or more. The upgrade process notifies the user if the upgrade succeeded or failed.
- The reflash operation consumes all bandwidth of the bus connecting the management controllers. Consequently, other software components, such as the ProLiant Rack Agent might not report up-to-date information during the flash upgrade.

Storage Agents

The Storage Agents collect information from Fibre Channel, drive array, SCSI, and IDE subsystems at periodic intervals, make the collected data available to the UCD SNMP agent, and provide SNMP alerts.

Prerequisites

The Storage Agents require that the HP Server Management Drivers and Agents (hpsasm) to be installed first.

1. Check for the presence of the hpsasm RPM by typing:

```
% rpm -q hpsasm
```

Note: This should return the package name and version if it is installed.

2. Obtain the Storage Agents and hpsasm RPMs from <http://h18000.www1.hp.com/products/servers/linux/softwaredrivers.html>.

Installing the Storage Agents

If you have a previous version of the storage agents installed, you must uninstall these components before installing the new RPM file.

1. To check if the agents are loaded, type:

```
% ps - ef | grep cma
```

Note: Look for cmastorpeerd, cmaeventd, cmaidad, cmafcad, cmaided, and cmascsid in the list.

2. To remove the package, type:

```
% rpm -e cmastor
```

3. To install the Storage Agents, type the following at a command prompt:

```
% rpm -ivh cmastor-<version>.i386.rpm
```

During installation, the Storage Agents are configured to start automatically when the snmpd is running and to shut down automatically when snmpd is not running.

To manually start, stop, and restart the Storage Agents, type the following commands:

```
#/opt/compaq/storage/etc/cmastor start
#/opt/compaq/storage/etc/cmastor stop
#/opt/compaq/storage/etc/cmastor restart
```

Upgrading the Storage Agents

If you are upgrading from a previous version of the Storage Agents, type:

```
%rpm -Uvh cmastor-<version>.i386.rpm
```

Removing the Storage Agents

To remove the Storage Agents, type:

```
%rpm -e cmastor
```

Storage Peer Agent

The Storage Peer Agent extends the SNMP "enterprise" MIB to include Storage MIB data. The Storage Peer supports get, set, and trap operations on data items defined in the Storage MIB.

Data Collection Agent processes gather Storage MIB data. Each agent collects and saves MIB data in files that are read by the Storage Peer during SNMP get commands. The Storage Peer routes the SNMP set commands to the agent responsible for managing the selected Storage MIB data item. SNMP trap commands are generated by Data Collection Agents and routed by the Storage Peer to the SNMP daemon.

At Storage Peer startup, all MIB items in the file `/opt/compaq/storage/etc/cmastorobjects.conf` are read by `cmaX` and registered with the SNMP agent. During installation, the Storage Peer is configured to start automatically when the SNMP agent is running and to shut down automatically when the SNMP agent exits. Linux run-level configuration tools can be used to change Storage Peer configuration. Storage Peer (`cmastorpeerd`) should be started after SNMP agent `snmpd` is started and should be killed after `snmpd` is killed.

The Storage Peer Agent can be started and stopped manually by typing the following commands:

```
#/opt/compaq/storage/etc/cmastor start cmastorpeerd
#/opt/compaq/storage/etc/cmastor stop cmastorpeerd
```

Storage Data Collection Agents

Each Storage Data Collection Agent gathers and saves Storage MIB data to files in the Storage Data Registry. The Data Collection Agents periodically update MIB data at configurable poll intervals.

The agent responsible for managing the selected MIB data item performs SNMP set commands. Data Collection Agents generate SNMP trap commands.

The Storage data registry (`/var/spool/compaq/storage/registry`) is composed of standard Linux directories and associated files. Each file in the data registry is a logical object containing "n" related data items.

The `-p poll_time` command line argument, which can be used with the Storage Agents, specifies the number of seconds to wait between data collection intervals. The minimum allowed value is 1 second and the default value is 15 seconds.

The agents can be started manually by typing the following command:

```
%/opt/compaq/storage/etc/cmastor start <agent> -p poll_time
where <agent> can be cmaidad, cmafcad, cmaided, or cmascsid
```

Increasing the agent poll_time setting improves system performance but decreases the data collection rate. Conversely, decreasing the agent poll_time setting increases the data collection rate but may decrease system performance.

The agents can be stopped manually by typing the following command:

```
%/opt/compaq/storage/etc/cmastor stop <agent>  
where <agent> can be cmaidad, cmafcad, cmaided, cmascsid, or cmaeventd
```

IDA Agent

The IDA Agent gathers data for the IDA MIB. The data includes:

- IDA controller information
- IDA accelerator information
- IDA logical drive information
- IDA physical drive information

The IDA Agent is located in /opt/compaq/storage/bin/cmaidad. The suggested poll_time is 15 seconds (default). The minimum poll_time is 5 seconds.

FCA Agent

The FCA agent gathers data for the FCA MIB. The data includes:

- FCA host controller information
- FCA array controller information
- FCA array accelerator information
- FCA logical drive information
- FCA physical drive information
- FCA storage system chassis information
- FCA storage system power supply information
- FCA storage system fan information
- FCA storage system temperature information
- FCA storage system backplane information

The FCA Agent is located in /opt/compaq/storage/bin/cmafcad. The suggested poll_time is 15 seconds (default). The minimum poll_time is 5 seconds.

IDE Agent

The IDE Agent gathers data for the IDE MIB. The data includes:

- IDE host controller information
- ATA disk information
- ATAPI device information

The IDE Agent is located in /opt/compaq/storage/bin/cmaided. The suggested poll_time is 15 seconds. The minimum poll_time is 5 seconds.

SCSI Agent

The SCSI Agent gathers data for the SCSI MIB. The data includes:

- SCSI host controller information
- SCSI disk drive information
- SCSI tape drive information

The SCSI Agent is located in `/opt/compaq/storage/bin/cmascsid`. The suggested poll time is 15 seconds. The minimum poll time is 5 seconds.

Event daemon

The Event Daemon gathers storage hardware events from firmware and passes them on to other agents upon request.

During installation, the Event Daemon is configured to start automatically when `snmpd` is started and to shut down automatically when `snmpd` is stopped.

The Event Daemon is located in `/opt/compaq/storage/bin/cmaeventd`. To start the daemon manually, type:

```
#/opt/compaq/storage/bin/cmaeventd
```

NIC Agents

The NIC Agents collect information from network interface controllers at periodic intervals, make the collected data available to the UCD SNMP agent, and provide SNMP alerts.

Prerequisites

The NIC Agents require that the HP Server Management Drivers and Agents (`hpsm`) be installed first.

1. Check for the presence of the `hpsm` RPM by typing:

```
% rpm -q hpsm
```

Note: This should return the package name and version if it is installed.

2. Obtain the NIC Agents and `hpsm` RPMs from <http://h18000.www1.hp.com/products/servers/linux/softwaredrivers.html>.

Installing the NIC Agents

If you have a previous version of the NIC Agents installed, you must uninstall these components before installing the new RPM file.

1. To check if the NIC Agents are loaded, type:

```
%ps -ef | grep cma
```

Note: Look for `cmanicd` in the list.

2. To remove this package, type:

```
%rpm -e cmanic
```

3. To install the NIC Agents, type the following at the command prompt:

```
%rpm -ivh cmanic-<version>.i386.rpm
```

Upgrading the NIC Agents

If you are upgrading from a previous version of the NIC Agents, type:

```
%rpm -Uvh cmanic-<version>.i386.rpm
```

Removing the NIC Agents

To remove the NIC Agents, type:

```
%rpm -e cmanic
```


Using the NIC Agents

The NIC Agents gather data for the NIC MIB from NIC device drivers supporting the `/proc` file system reporting format. The data includes:

- Physical mapping and configuration data for each network interface.
- Network statistics for Ethernet interfaces. Information is provided for HP controllers. Limited information may be provided for third-party NICs.

During installation, the NIC Agent is configured to automatically start at the same run levels as the `snmpd` daemon.

You can manually start, stop, and restart the `cmanic` daemon by typing the following commands:

```
#/opt/compaq/nic/etc/cmanic start
#/opt/compaq/nic/etc/cmanic stop
#/opt/compaq/nic/etc/cmanic restart
```

Note

Anytime `snmpd.conf` or `snmpd.local.conf` configuration files are changed or the `SNMPCONFPATH` environment variable is changed, the `cmanic` daemon must be restarted.

A NIC Agent README file is placed in the `/opt/compaq/nic/etc` directory after installation. The README file contains the most current information about the NIC Agents.

Command line arguments

Table 15 includes the command line arguments that can be passed to `cmanicd` from the `/opt/compaq/nic/etc/cmanicd` script.

Table 15. Command line arguments

Parameter	Description
-p poll_time	Specifies the number of seconds between data caching and poll intervals. NIC drivers are only queried when a request comes in and the cached information is older than the specified poll interval. The default value is 20 seconds. The minimum poll time is 10 seconds.
s set_state	Specifies whether SNMP set commands are allowed for this agent. A <code>set_state</code> of OK (default) means that SNMP set commands are allowed. A <code>set_state</code> of NOT_OK means that SNMP set commands are not allowed.
t trap_state	Specifies whether the NIC Agent is allowed to send traps or not. A <code>trap_state</code> of OK (default) indicates the NIC Agent may send SNMP traps. A <code>trap_state</code> of NOT_OK means that NIC Agent is not allowed to send traps.

For example, to set the poll interval to 30 seconds and prevent traps, change `PFLAGS=` to `PFLAGS="-p30 -t NOT_OK"` in the `/opt/compaq/nic/etc/cmanicd` script.

Traps are configured using the standard SNMP configuration file (`snmpd.conf`). Refer to the `snmpd.conf` manual page for the most current configuration information. When `snmpd.conf` or `snmpd.local.conf` configuration files are changed or when the `SNMPCONFPATH` environment variable is changed, the `cmanic` daemon must be restarted.

If default High or Medium firewall configuration is selected during the installation of Red Hat Linux 7.2, external SNMP requests will be rejected by the system and the server will become

unmanageable. There are significant security implications to configuring firewall. Consider the `ipfw`, `ipchains`, `ipchains-save`, and `ipchains-restore` man pages as mandatory reading before making any change to firewall configuration.

The system should start accepting SNMP requests from Systems Insight Manager or other management consoles with the following command:

```
#ipchains -I input -s 16.101.168.68/255.255.255.255 \d 16.101.169.69/255.255.255.255  
161:161 \  
I eth0 -p udp -j ACCEPT
```

In the example above, 16.101.168.68 is the IP address of a remote system running management console (or issuing SNMP requests) and 16.101.169.69 is the IP address of the interface "eth0" of the server running Red Hat Linux 7.2.

Systems Insight Manager

HP Systems Insight Manager combines the best of Insight Manager 7, HP Tootools, and HP Servicecontrol Manager to deliver hardware fault, asset, and configuration management for all of your HP Systems.

HP SIM can be easily extended to deliver rapid deployment and performance management for ProLiant Servers, or workload and partition management for Integrity and HP 9000 systems. It can be extended with management for HP clients, storage, printers and power products, and can manage non- HP platforms through industry standard management protocols.

For installation information, refer to the "Installing on Linux" section of the *HP Systems Insight Manager Installation and User Guide*, which is available for download at <http://h18013.www1.hp.com/products/servers/management/hpsim/infolibrary.html>.

Rapid Deployment Pack

Rapid Deployment Pack is a server deployment solution that facilitates the configuration and deployment of high-volumes of servers via a web-based console using either scripting or imaging technology. Using Rapid Deployment Pack, server configuration time is reduced, making it possible to scale server deployments to high volumes in rapid fashion.

Rapid Deployment Pack integrates two powerful products: Altiris Deployment Solution and the ProLiant Integration Module. The ProLiant Integration Module consists of the SmartStart Scripting Toolkit, HP supplied deployment events, and important Support & Documentation. This deployment solution for Linux provides a fast, easy, point-and-click method for deploying servers from a central deployment management console. Through the console, you can deploy servers using imaging or scripting.

Rapid Deployment Pack is a key deployment solution for all ProLiant servers. It has advanced features that can detect and display server blades based on their physical rack, enclosure, and bay location. You can set the deployment console to automatically install or redeploy a previous computer's configuration to a new blade server when it replaces another blade server.

For installation information, refer to the *Rapid Deployment Pack Linux Edition Installation Guide*, which is available for download at www.hp.com/servers/rdp (select **Linux Edition**, and then **Support & Documents**).

Troubleshooting

This section describes common problems that might occur during installation and operation of the Host OS Agent, the Standard Equipment Agent, the SCSI Agent, the System Health Agent, the Threshold Agent, and the Peer Agents. In most cases, a workaround is available and described in Table 16.

Table 16. Known issues

Issue 1	Cannot manage server from Insight Manager 7 or Systems Insight Manager, grayed-out utilization button, or missing file system space used information in the mass storage window
Workaround	<ol style="list-style-type: none">1. Check if the network is working by pinging the server from the system running Insight Manager 7 or Systems Insight Manager.2. Make sure that Insight Manager 7 or Systems Insight Manager is using the correct community string, which is defined in the server's <code>snmpd.conf</code> files (refer to <code>#man 5 snmp_config</code> for default <code>snmp.conf</code> files).3. Make sure that post-installation configurations have been performed properly, if needed.4. Check the Host OS Agent status with the Linux command <code>ps -ef grep cmahostd</code>.<ul style="list-style-type: none">• If the agent is not running, make sure that the Server Management Drivers and Agents script is installed properly under <code>/etc/init.d</code> (for Red Hat Linux, use <code>#!/sbin/chkconfig -list cmafdtn</code> command). Start the Host OS Agent manually using the following command: <pre>#!/opt/compaq/foundation/etc/cmafdtn start cmahostd</pre>• If the Host OS Agent is running and not reporting data, or if it was correctly started but is no longer running, check the file <code>/var/spool/compaq/cma.log</code> for error messages. You must be logged in as "root" to access this file.
Issue 2	Grayed-out system board, expansion boards, or configuration buttons
Workaround	<p>Check the Standard Equipment Agent status with the Linux command <code>ps -ef grep cmastdeqd</code>.</p> <ul style="list-style-type: none">• If the agent is not running, make sure that Server Agents Start script is installed properly under <code>/etc/init.d/</code> (for Red Hat Linux, use the <code>#!/sbin/chkconfig -list cmasvr</code> command). Start the Standard Equipment Agent manually using the following command: <pre>#!/opt/compaq/server/etc/cmasvr start cmastdeqd</pre>• If the agent is running and not reporting data, or if the agent was correctly started but is no longer running, check the file <code>/var/spool/compaq/cma.log</code> for error messages. You must be logged in as "root" to access this file.

Issue 3	Missing SCSI drive information in the mass storage window
Workaround	<p>Check the SCSI Agent status with the command <code>ps -ef grep cmascsid</code>.</p> <ul style="list-style-type: none"> If the agents are not running, they must be started (refer to the start/stop documentation for the appropriate agent). If the agent is running and not reporting data or, if it was correctly started but is no longer running, check the file <code>/var/spool/compaq/cma.log</code> for error messages. You must be logged in as "root" to access this file.
Issue 4	Added SCSI devices do not appear
Workaround	<p>To minimize system overhead, the cmascsid process does not search for new hardware every poll_time. There will be a delay of up to 32 times the poll interval, which is normally every 30 seconds, up to 16 minutes in the default case, before new SCSI devices are discovered by cmascsid and reported to ProLiant Management Console. Once the hardware has been discovered, its status is checked each poll_time and reported to ProLiant Management Console when it has changed.</p>
Issue 5	Missing or 0-value SCSI hard drive serial number or capacity
Workaround	<p>Most SCSI hard drives do not make this information available to the host when the drive media is not spinning. Hot-pluggable drives do not start spinning until the operating system attempts to open them. Obtaining this information requires access to the drive. After the drive is first opened, to minimize system overhead, there may be a delay of up to 32 times the poll_time of the cmascsid process before updated information is available to ProLiant Management Console.</p>
Issue 6	Grayed-out button for a SCSI controller
Workaround	<p>Information about the configuration of the device indicates that a SCSI controller is installed, but no further information is available. Several conditions result in a grayed-out button:</p> <ul style="list-style-type: none"> The SCSI agent process "cmascsid" may not be running. The SCSI controller may have been disabled by the System Configuration Utility. This may be an unsupported controller.
Issue 7	Missing or grayed-out storage controllers in the mass storage window
Workaround	<p>Check the Mass Storage Agent status with the Linux command <code>ps -ef grep cma</code>. You should see entries for cmaidad, cmafca, cmascsid, cmaided.</p> <ul style="list-style-type: none"> If the agent is not running, it must be started (refer to the start/stop documentation for the appropriate agent). If the agent is running and not reporting data or if it was correctly started but is no longer running, check the file <code>/var/spool/compaq/agenterrs.log</code> for error messages. You must be logged in as "root" to access this file.
Issue 8	Grayed-out recovery button in the device view window, grayed-out auto recovery button in the recovery window, or grayed-out environment button in the recovery window
Workaround	<ol style="list-style-type: none"> Check to make sure your system supports the System Health Agent features. These features are supported only on HP ProLiant servers. Check the System Health Agent status with the Linux command <code>ps -ef grep cmahealthd</code>. If the agent is not running, it must be started (refer to the start/stop documentation for the System Health Agent).
Issue 9	Grayed-out Remote Insight button in the recovery window
Workaround	<p>A grayed-out Remote Insight button can be caused by one of the following:</p> <ul style="list-style-type: none"> The Remote Insight Controller may not be configured properly. The Remote Insight Driver may not be installed. The Remote Insight Agent cmasm2d may not be running.

Issue 10 Unable to change any values on the managed server or no SNMP traps/alarms are received

Workaround

1. Make sure that the SNMP Agent, the Peer agent, and the agent processing the set are all running.
2. Check the agent command line arguments in the agent's start script files.
3. Verify that either the argument `-s OK` is present or that default `set_state` is OK for the agent. This process enables SNMP sets for this agent only.
4. Verify that the server SNMP community string defined in your `snmpd.conf` (using `rwcommunity` keyword) matches the community string defined at the management console.
 - If you are using Insight Manager 7 or Systems Insight Manager, the community string can be set in Device Setup window. For more information, refer to the section on community strings in the Insight Manager 7 or Systems Insight Manager Help file.
 - If you changed the `snmpd.conf` files, you need to refresh `snmpd` and agents with the following commands:

```
#killall - HUP snmpd
#/etc/init.d/hpsasm restart agents
```
5. Test the traps by setting a threshold on an item that will cause a trap using the Set Threshold feature of Insight Manager 7 or Systems Insight Manager. Refer to the section "Set Threshold" in the Insight Manager 7 or Systems Insight Manager user guide for more information.
 - If traps still do not function, have your Linux device send traps to itself. Run the Linux SNMP trap receiving utility `snmptrapd -P`.
 - Next, generate a trap to localhost using the Linux `snmptrap` utility. The Linux command `snmptrapd -P` should display the trap. (See `man snmptrapd` and `man snmptrap` for more information).

Issue 11 Unable to set thresholds on MIB items or no user-defined SNMP traps are received

Workaround

Check the Threshold Agent status with the Linux command: `ps -ef | grep cmathreshd`. If the agent is not running, make sure that the Server Management Drivers and Agents script is installed properly under `/etc/init.d/` (for Red Hat Linux, use `#/sbin/chkconfig -list cmafdtn` command). Start the Threshold Agent using following command:

```
#/opt/compaq/foundation/etc/cmafdtn start cmathreshd
```

If the agent is running and not reporting data, or if it was correctly started but is no longer running, check the file `/var/spool/compaq/cma.log` for error messages. You must be logged in as root to access this file. Verify that the server SNMP community string defined in your `snmpd.conf` (using `rwcommunity` keyword) matches the community string defined at the management console. If you are using Insight Manager 7 or Systems Insight Manager, the community string can be set in the Device Setup Window. For more information, refer to the section on community strings in the Insight Manager 7 or Systems Insight Manager Help file.

If sets still do not work, perform the following procedure:

1. Stop the Threshold Agent using the following command:

```
#/opt/compaq/foundation/etc/cmafdtn stop cmathreshd
```

2. Delete previous alarm threshold files with the following command:

```
#rpm -f /var/spool/compaq/foundation/registry/threshold/*
```

3. Start the Threshold Agent using the following command:

```
#/opt/compaq/foundation/etc/cmafdtn start cmathreshd
```

Issue 12	Disabling SNMP sets for a specific agent
Workaround	Stop the agent associated with the desired MIB. Change the agent command line argument set switch to -s NOT_OK in the /etc/init.d/cma* file. This disables SNMP sets for this agent only. Restart the agent.
Issue 13	Disabling SNMP traps for a specific agent
Workaround	Stop the agent. Change the agent command line argument trap switch to -t NOT_OK in the /etc/init.d/cma* file. This disables SNMP traps for this agent only. Restart the stopped agent.
Issue 14	Disabling remote reboot
Workaround	<p>Stop the Server Standard Equipment Agent using following command:</p> <pre>#/opt/compaq/server/etc/cmasvr stop cmastdeqd</pre> <p>Edit /opt/compaq/server/etc/cmastdeqd and change the cmastdeqd agent command line reboot switch to -r NOT_OK. This disables SNMP reboots for this device only. Restart Standard Equipment agent.</p>
Issue 15	Peer Agents will not run
Workaround	<p>Check the /var/spool/compaq/cma.log file for messages. If it is caused by no running snmpd, then configure snmpd to start automatically during boot. If you changed the snmpd.conf files, you must refresh snmpd and agents with following commands:</p> <pre>#killall -HUP snmpd #/etc/init.d/hpasm restart agents</pre>

Conclusion

This HOWTO provides instructions for installing, upgrading, and removing management software, including the prerequisites for using this software with and without errata kernels, and contains usage information for the HP Server Management drivers and agents, HP Lights-Out drivers and agents, HP storage agents, and the HP NIC agents.

For more information

www.hp.com/linux

Linux and HP website

Call to action

To help us better understand and meet your needs for ISS technology information, please send comments about this paper to: TechCom@HP.com.

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